

# Fig. 1 Prior Art

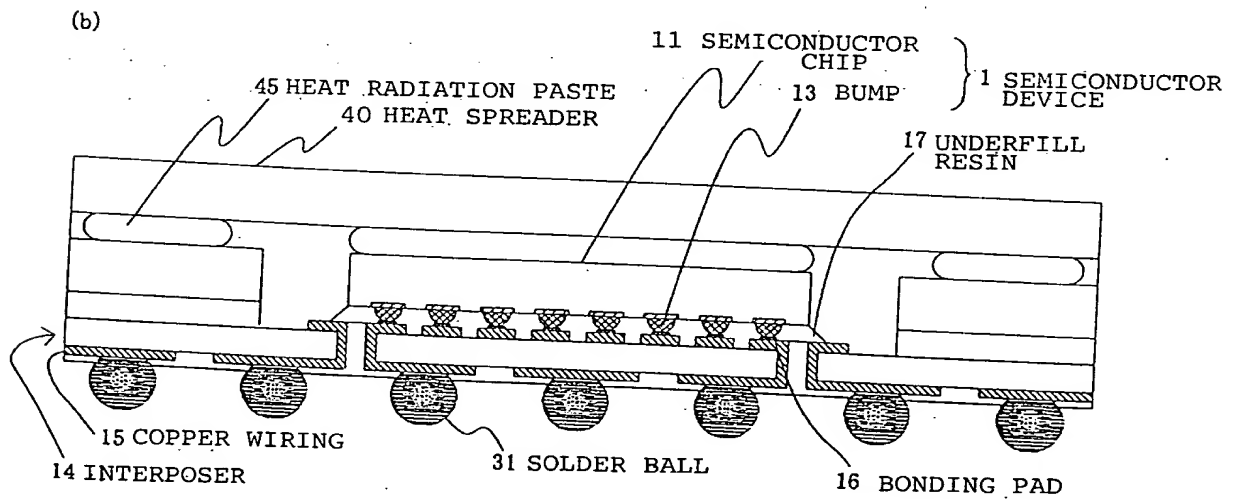
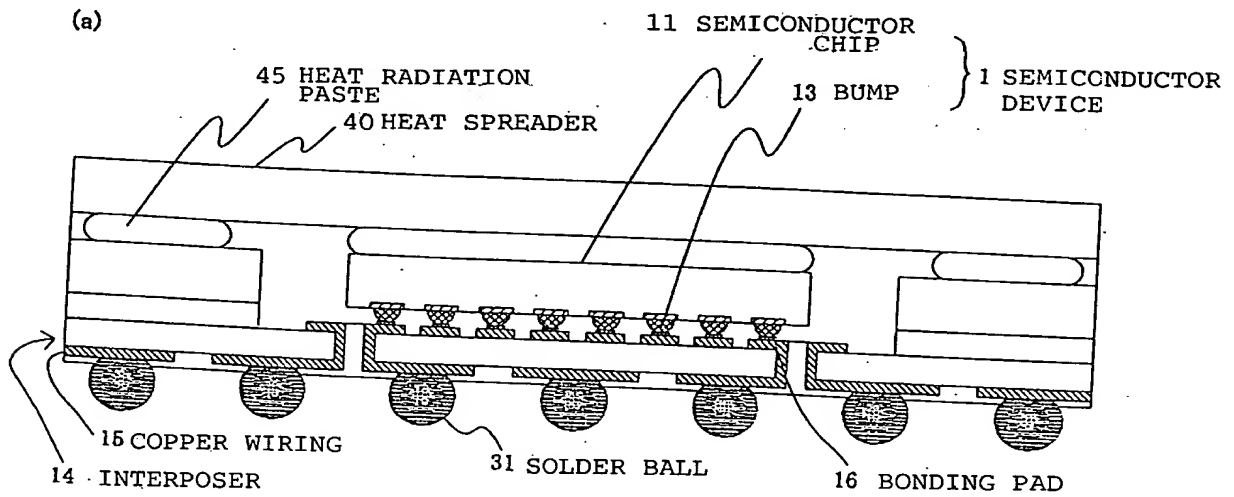


FIG. 10-86262860


[illegible]

FIG. 1 is a perspective view of a semiconductor chip 11. The chip is rectangular with a central opening. A pad electrode 12 is located on the top surface of the chip, near the right edge. The pad electrode is a small, rectangular, shaded area. A label 12 points to the pad electrode, and a label 11 points to the semiconductor chip.

Diagram of a rectangular plate with two square bumpers at opposite ends. The right bumper is labeled "13 BUMP" with an arrow pointing to it.

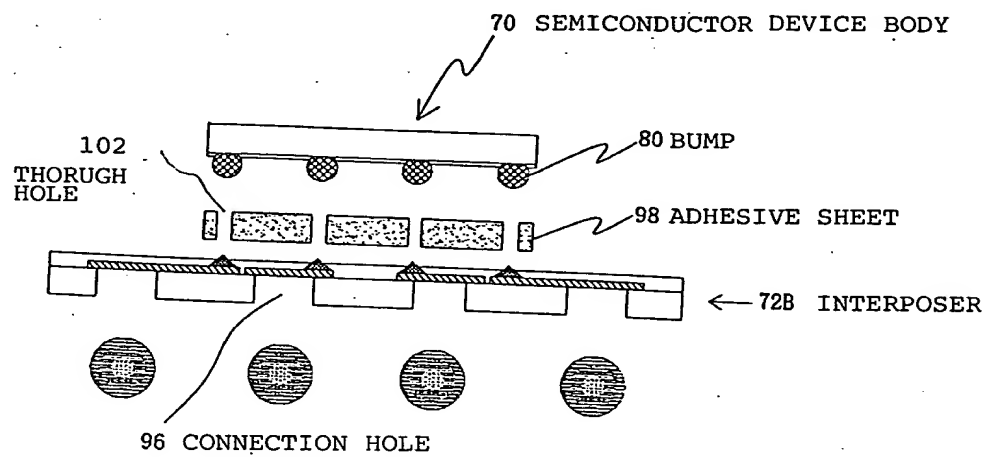
18 PROTECTION FILM

This diagram shows a cross-sectional view of a substrate with a protection film. The substrate is a rectangular block with a stippled texture. A thin, solid black line, labeled '18 PROTECTION FILM', is applied to the top surface of the substrate. Two rectangular regions on the top surface are filled with a cross-hatched pattern, representing specific areas of interest or features.



← 2 SEMICONDUCTOR DEVICE

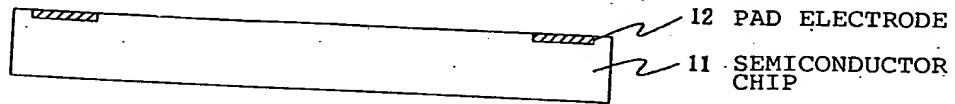
Fig. 3 Prior Art



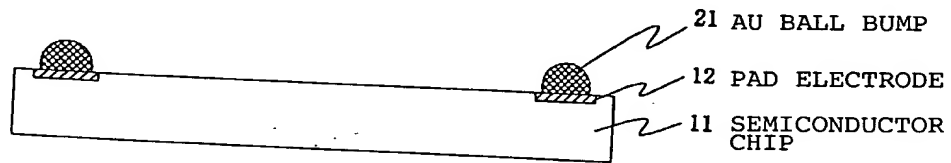
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Fig. 4

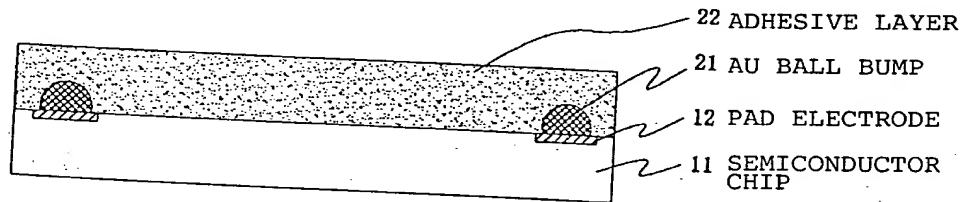
(a)



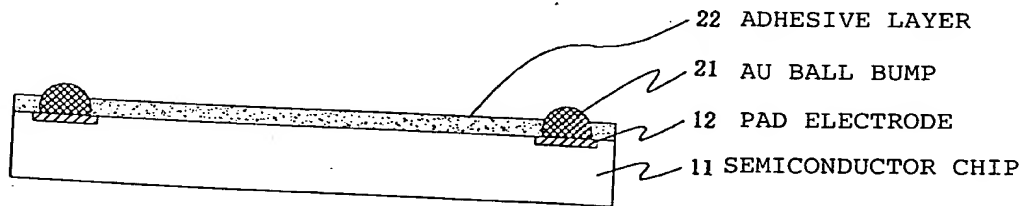
(b)



(c)



(d)

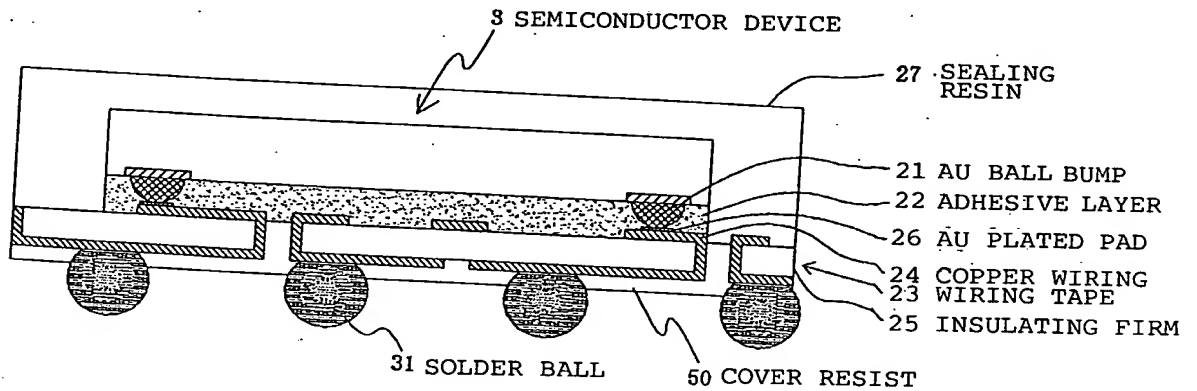


3 SEMICONDUCTOR DEVICE

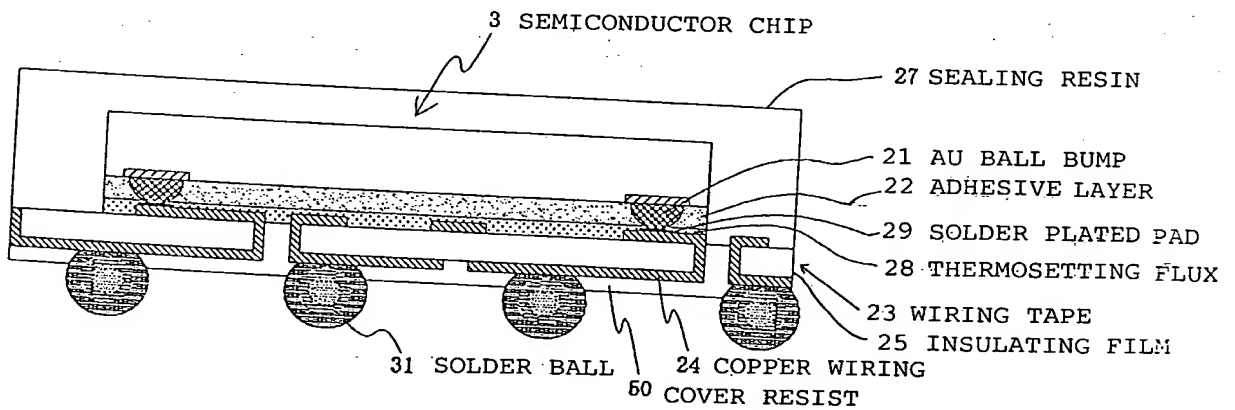
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# Fig. 5

(a)



(b)



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Fig. 6

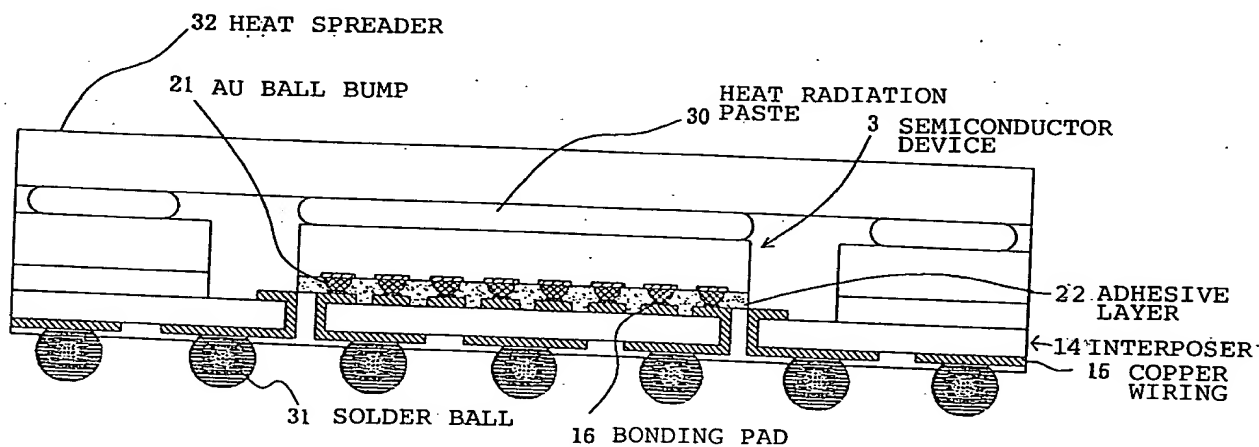
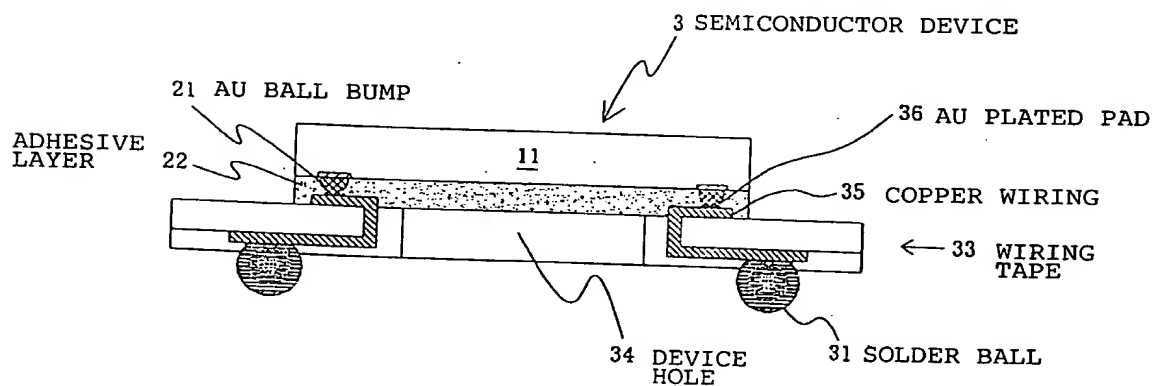
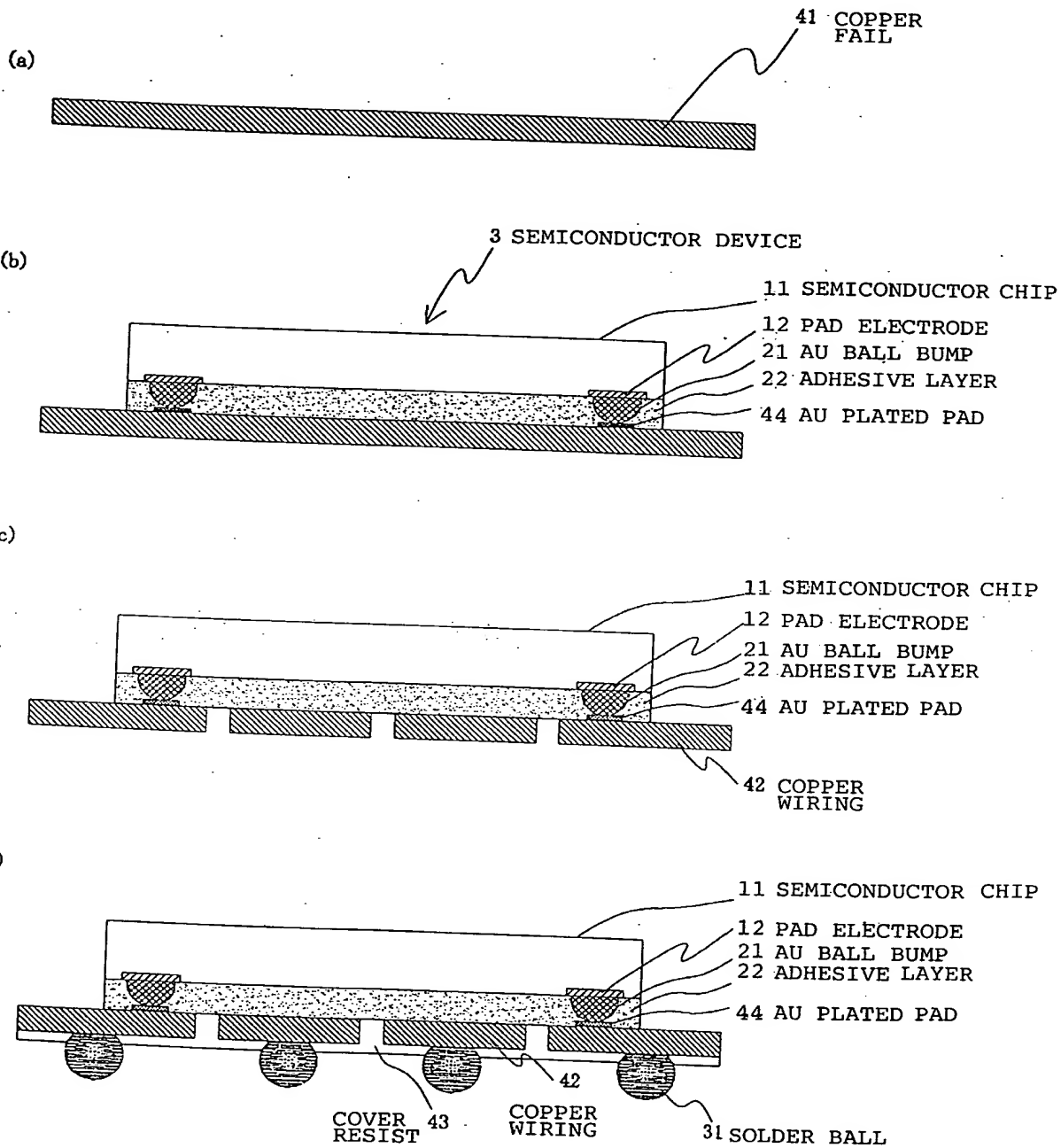


Fig. 7



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# Fig. 8



FOE240-8626E860

**06303B**

A cross-sectional view of a semiconductor chip assembly. The assembly consists of a semiconductor chip (11) mounted on a substrate. The chip is connected to the substrate by a pad electrode (12) and an Au ball bump (21). An adhesive layer (22) is located between the chip and the substrate. The substrate has a copper wiring (42) and a cover resist (43). An Au plated pad (44) is also present on the substrate. A sealing resin (27) is applied to the top of the chip and the pad electrode.

27 SEALING RESIN

11 SEMICONDUCTOR CHIP

12 PAD ELECTRODE

21 AU BALL BUMP

22 ADHESIVE LAYER

44 AU PLATED PAD

42 COPPER WIRING

43 COVER RESIST

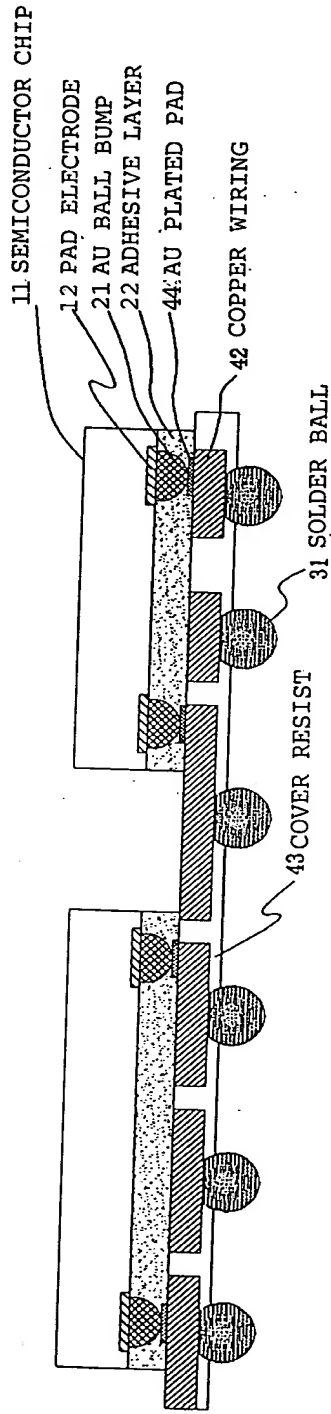
A cross-sectional view of a semiconductor chip assembly. The assembly consists of a semiconductor chip (11) mounted on a substrate. The chip is connected to the substrate via pad electrodes (12) and Au ball bumps (21). An adhesive layer (22) is located between the chip and the substrate. The substrate has a copper wiring layer (42) and a solder ball (31). A cover resist (43) is applied to the substrate. A heat radiation paste (45) is applied to the top of the chip, and a heat spreader (40) is mounted on the top of the chip. An Au plated pad (44) is located on the substrate. A heat spreader fixing adhesive (46) is applied to the bottom of the chip.

45 HEAT RADIATION PASTE  
40 HEAT SPREADER  
11 SEMICONDUCTOR CHIP  
12 PAD ELECTRODE  
21 AU BALL BUMP  
22 ADHESIVE LAYER  
44 AU PLATED PAD  
42 COPPER WIRING  
43 COVER RESIST  
31 SOLDER BALL  
46 HEAT SPREADER FIXING ADHESIVE

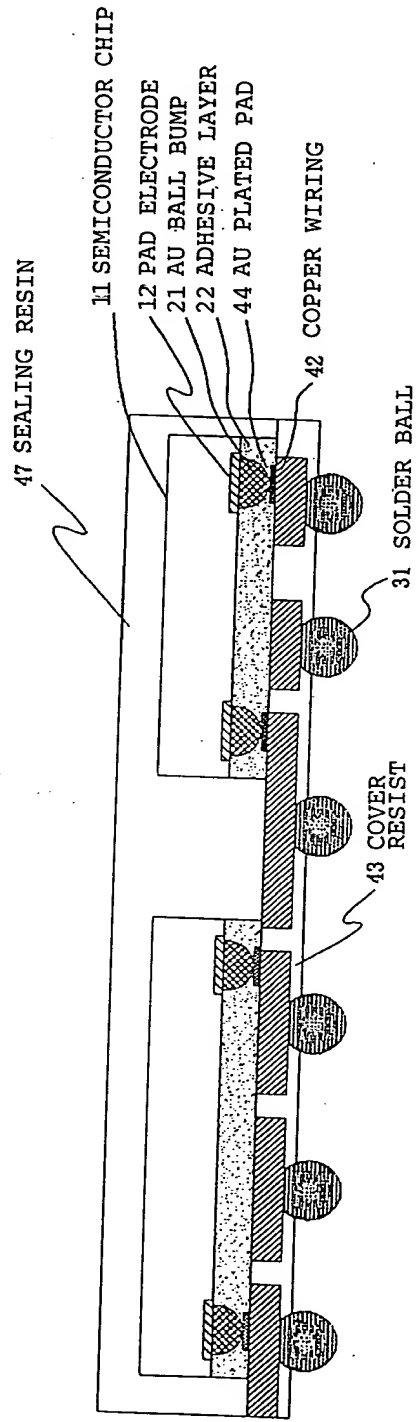


Fig. 10

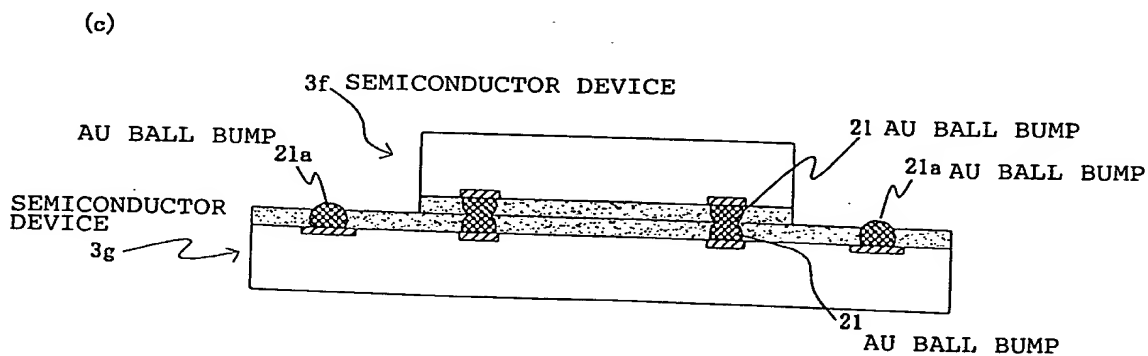
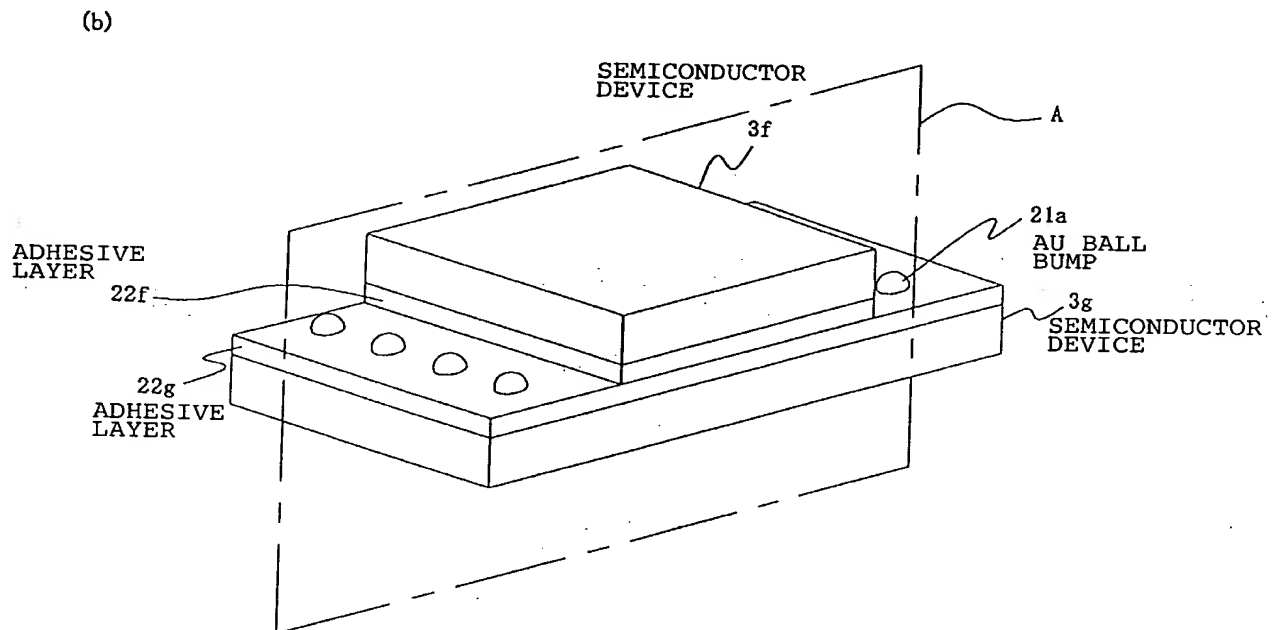
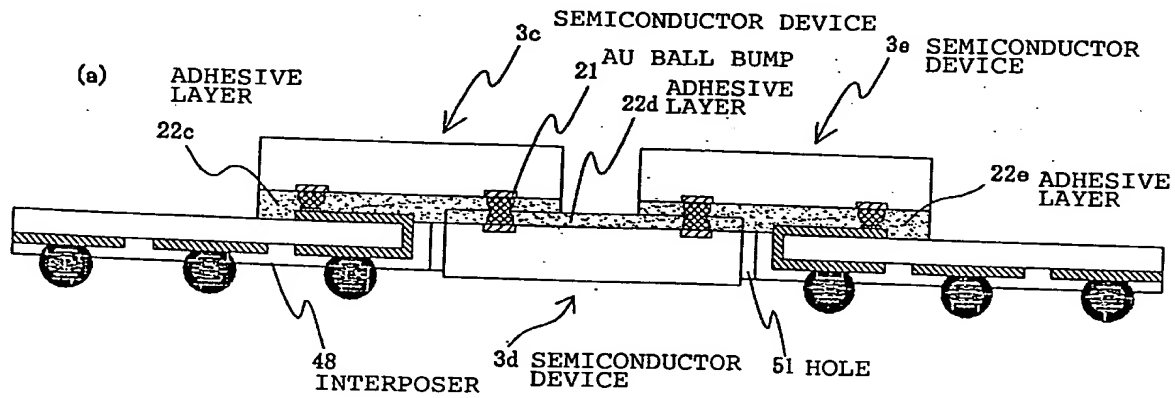
(a)



(b)



# Fig. 11



FOOTING 8626360

Fig. 12

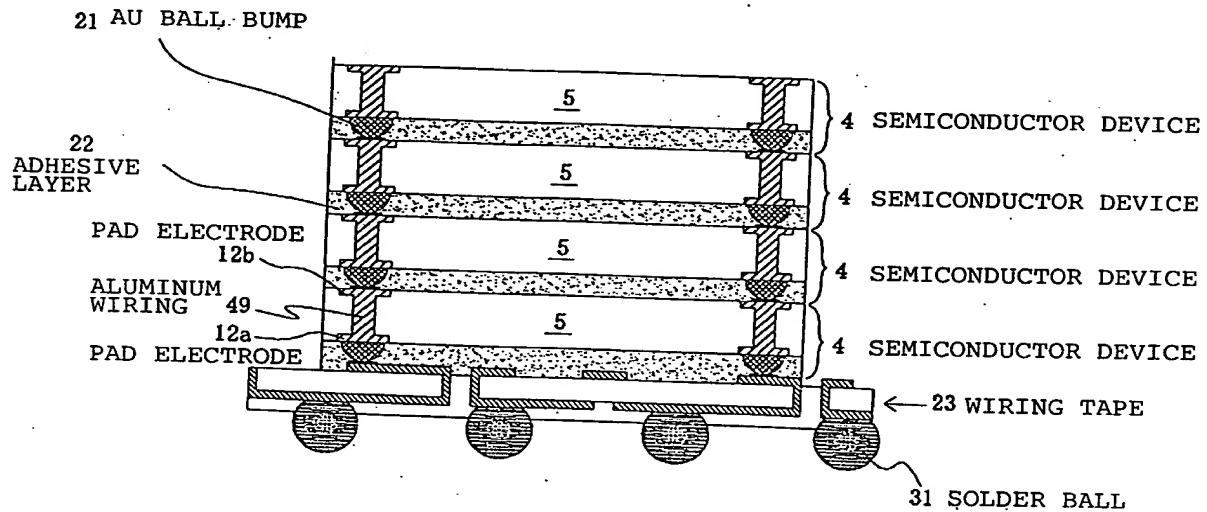
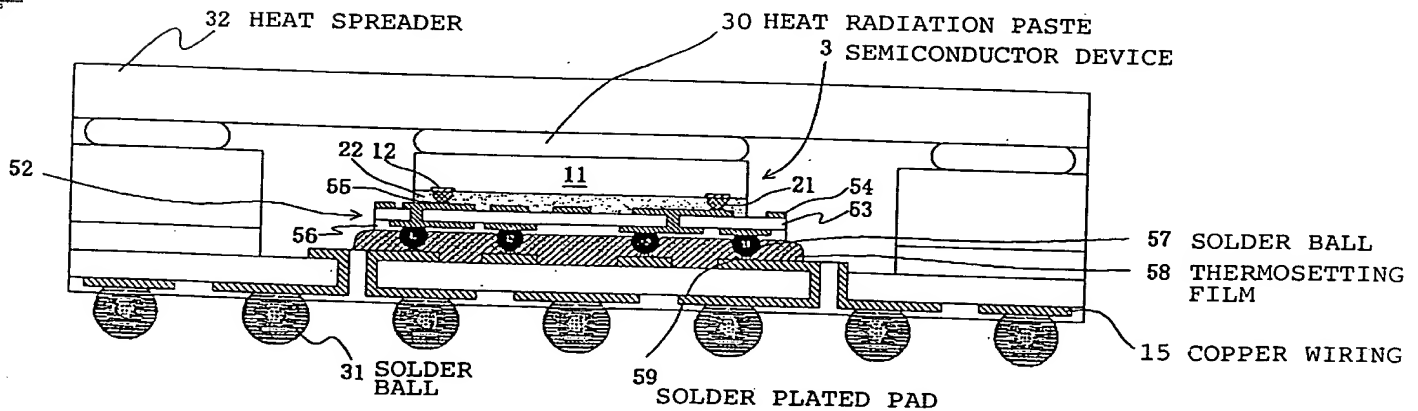


Fig. 13



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